



DIFFUSION BONDED TOOLING WITH CONFORMAL COOLING

Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake - (419) 255-5900

Serial No.
09/827,046

Sheet 1 of 7

Docket No.
1-82091

1/7

FIG. 1

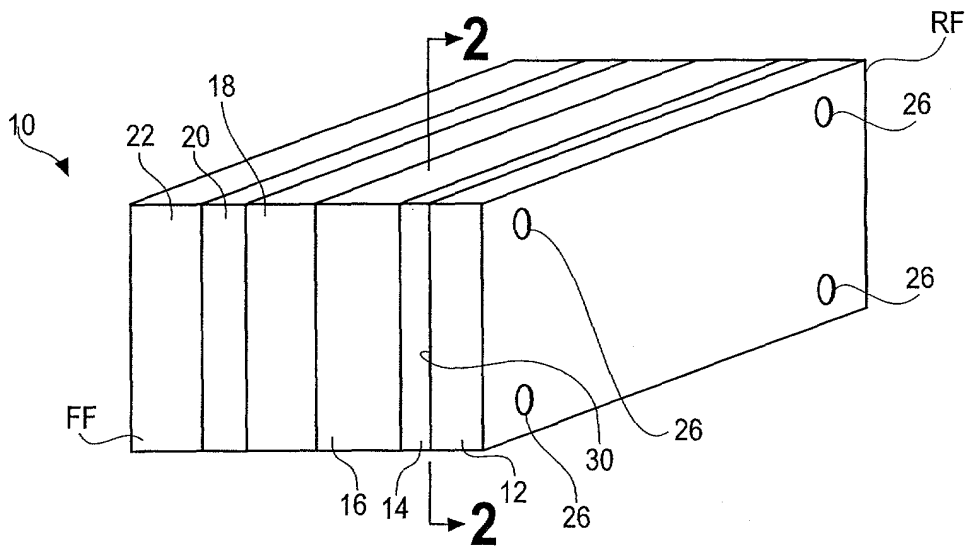
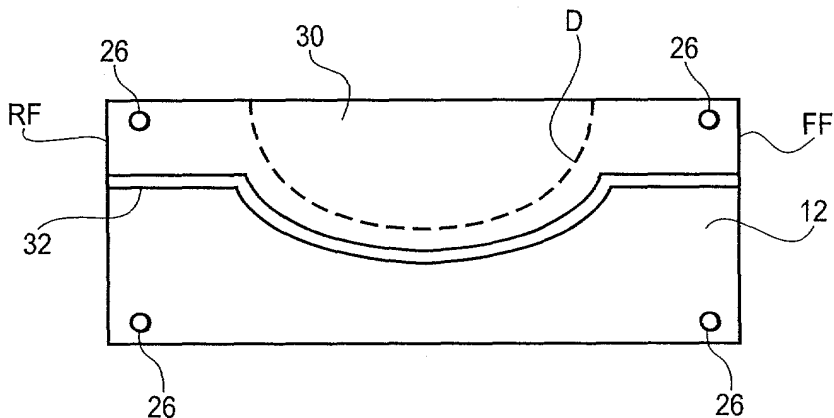


FIG. 2





Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake -(419) 255-5900

Serial No.
09/827,046

Sheet 2 of 7

Docket No.
1-82091

2/7

FIG. 3

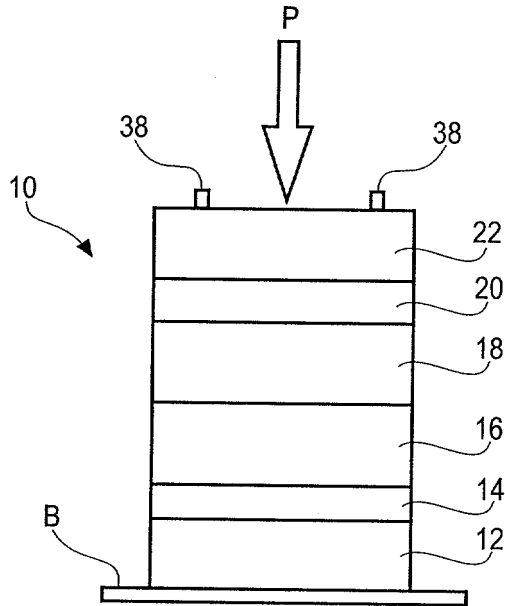
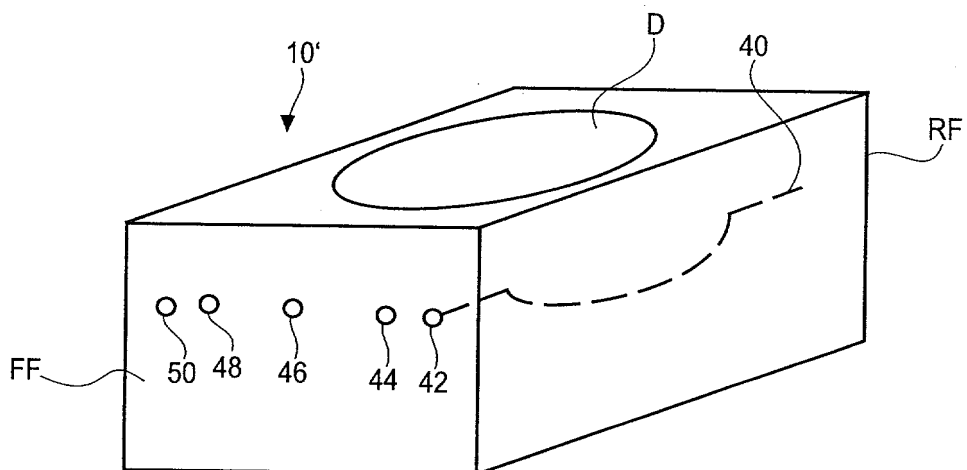


FIG. 4



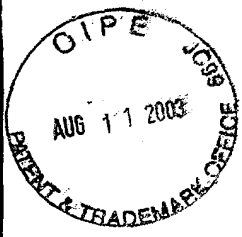


FIG. 5A

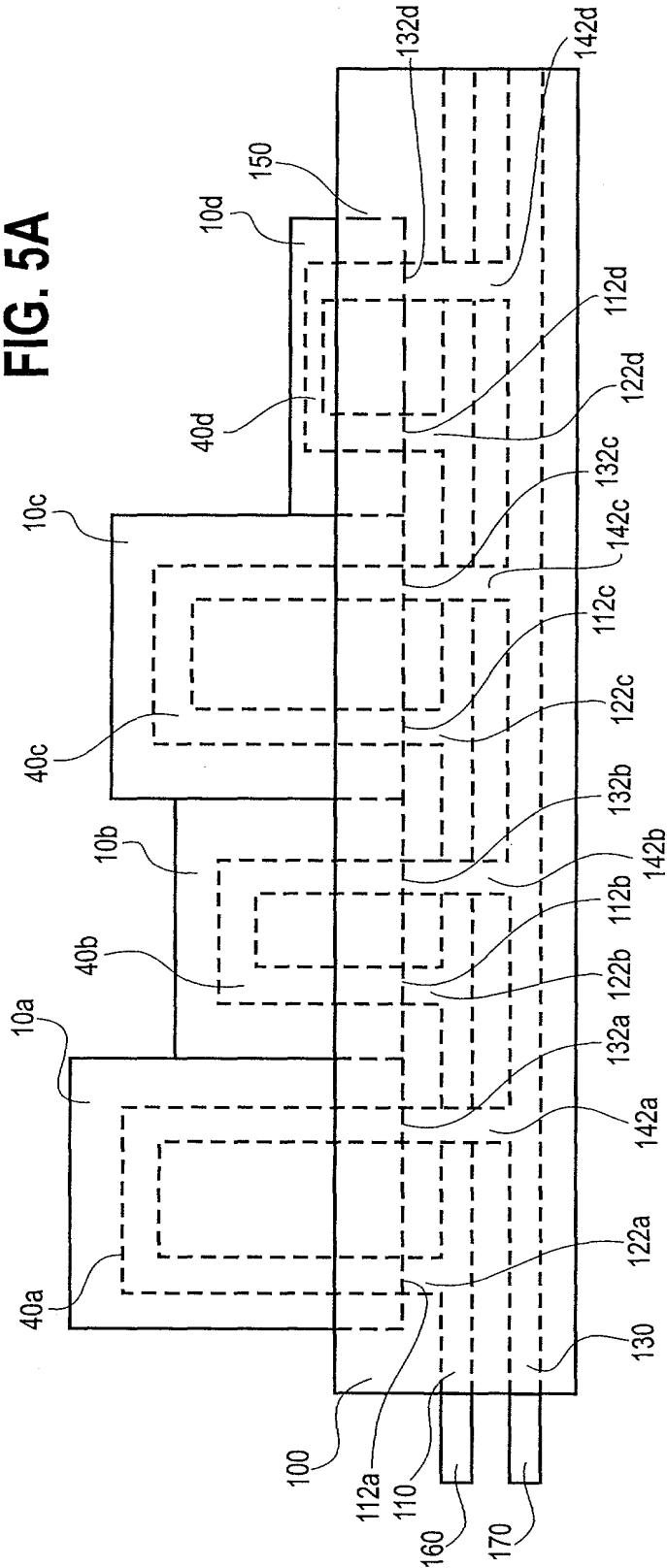
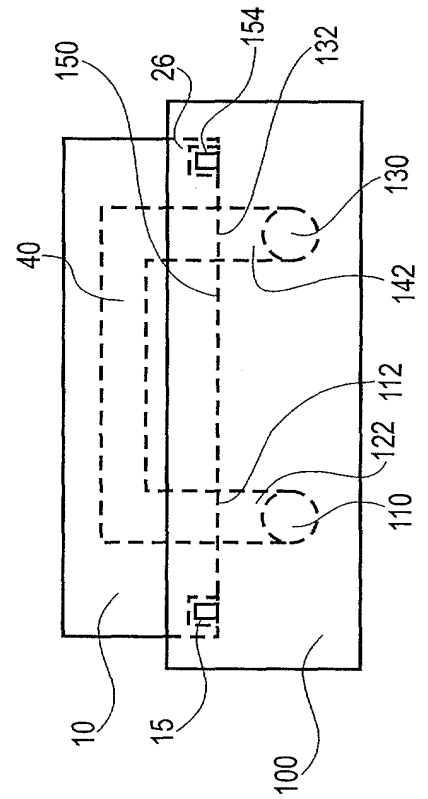


FIG. 5B



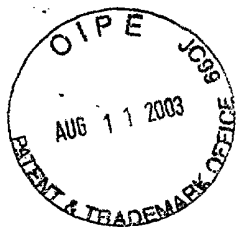


FIG. 6A

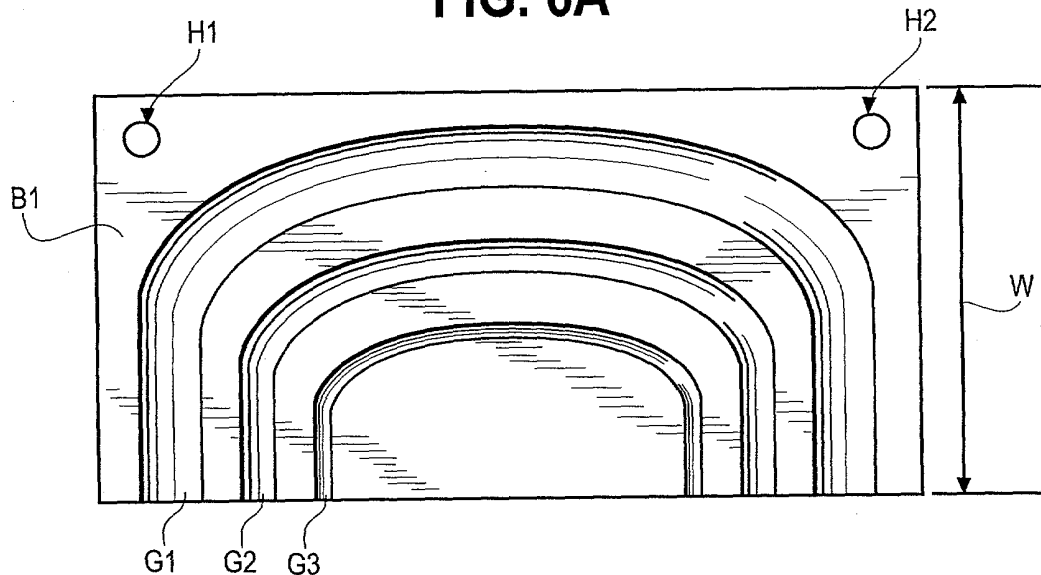
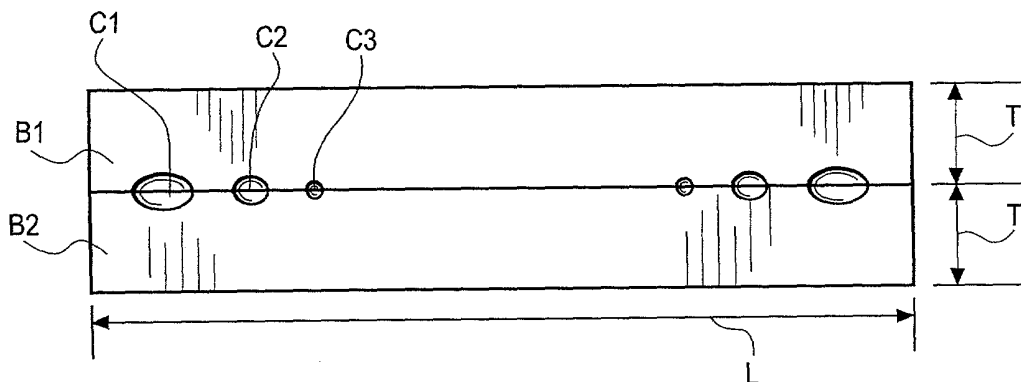


FIG. 6B





DIFFUSION BONDED TOOLING WITH CONFORMAL
COOLING

Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake - (419) 255-5900
Serial No. 09/827,046 Sheet 5 of 7 Docket No. 1-82091

5/7

FIG. 7

BOND STRENGTH

| BOND PRESSURE, ksi | % DEFORMATION | HEAT TREATED | HARDNESS, Rc | STRENGTH, ksi |
|--------------------------|---------------|-----------------|-----------------|------------------|
| 0.75 | 0.13 | N | 28 | 53 |
| 0.75 | 0.13 | Y | 54 | 45 |
| 1.5 | 1.5 | N | 30 | 143 |
| 1.5 | 1.5 | Y | 46 | 189 |
| 3.0 | 15.1 | N | 28 | 158 |
| 3.0 | 15.1 | Y | 46 | 219 |

S7 STRENGTH:

ANNEALED = 93ksi

HEAT TREATED = 300 KSI

S7 HARDNESS = 50 Rc



Name of Inventors: Joseph V. Bak, et al.
Name & Telephone Number of Person to Call If Necessary:
Scott A. Blake - (419) 255-5900

Serial No.
09/827,046

Sheet 6 of 7

Docket No.
1-82091

6/7

FIG. 8A

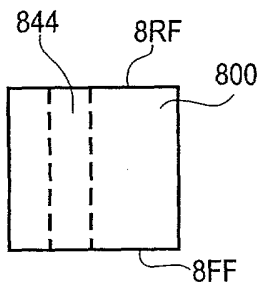


FIG. 8B

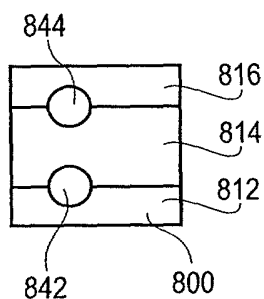


FIG. 9A

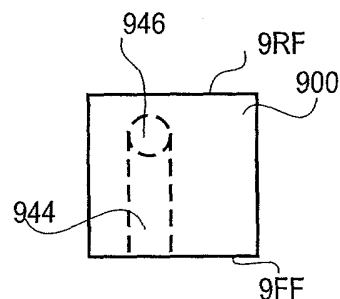


FIG. 9B

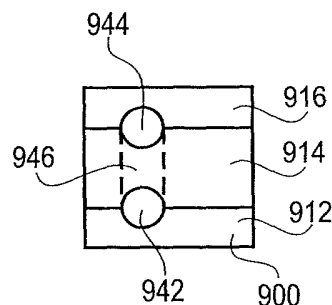


FIG. 10A

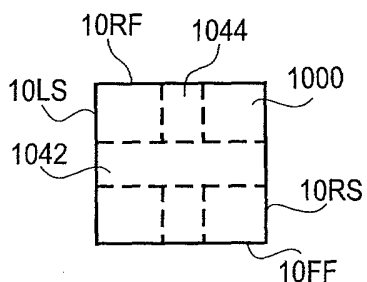


FIG. 10B

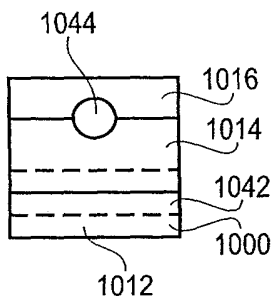


FIG. 11A

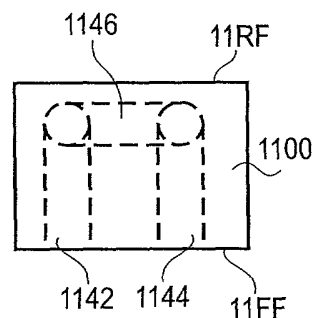


FIG. 11B

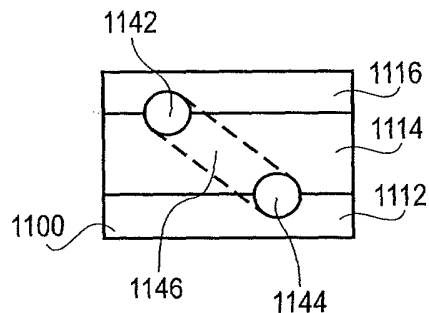




FIG. 12A

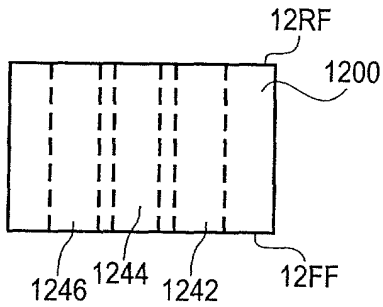


FIG. 12B

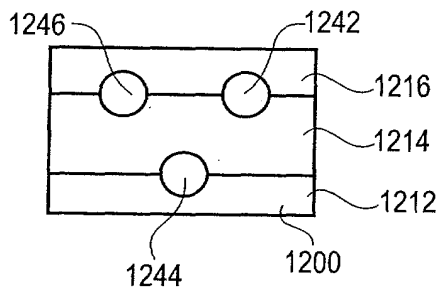


FIG. 13A

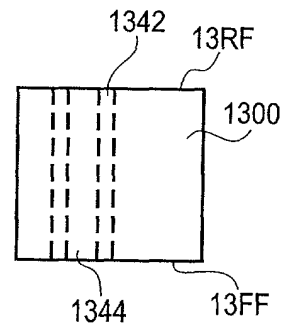


FIG. 13B

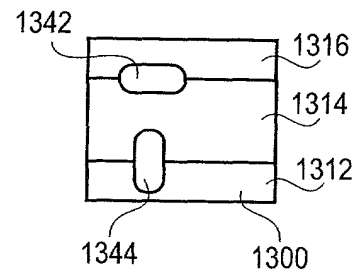


FIG. 14A

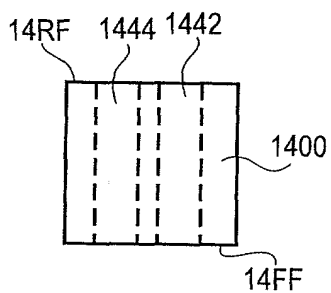


FIG. 14B

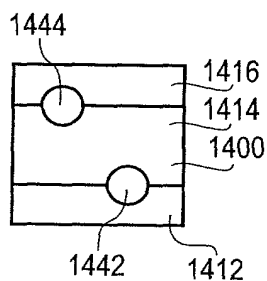


FIG. 15A

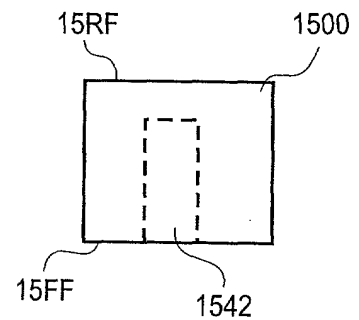


FIG. 15B

